

to excalation of vertebræ between the pelvis and head region of *M. levis* is shown in such facts as the following :—

- (a) The great amount of both excalation and intercalation which must be going on in different regions of the animal on such a hypothesis.
- (b) In some cases the girdle-piercing nerve may pass partly over and partly through the girdle, not showing that rigidity which on the excalation theory we should be led to expect.
- (c) The serial number of the girdle-piercing nerve may be different on the two sides of the same individual.

On the hypothesis of migration such facts receive an easy explanation, which is also in accordance with the existence of a greater caudal extension of the area of innervation of the pelvic fin in the males of *M. levis* than the females, and in the great amount of variability in *M. levis*, which species we suppose to have been derived from a more stable form such as *M. vulgaris* by a rostral migration of the pelvic girdle.

Hence migration being rendered very probable on other grounds, the posterior collector must be supposed to be formed as a direct result of that migration, and its undoubted connection with the shifting of the fin along the vertebral column is of great importance in explaining the formation of the anterior *nervus collector*.

“On the Least Potential Difference required to produce Discharge through various Gases.” By the Hon. R. J. STRUTT, B.A., Scholar of Trinity College, Cambridge. Communicated by LORD RAYLEIGH, F.R.S. Received October 17,—Read November 16, 1899.

(Abstract.)

The investigation, of which an account is given in this paper, deals with the potential difference required to produce sparks in various gases, between large parallel planes at a fixed distance apart, and at various pressures.

It was found by Mr. Peace* that the striking potential between two parallel plates in air diminished as the pressure diminished, till a certain point was reached, and then began to rise very rapidly. The pressure at which the striking potential was a minimum, depended on the distance between the plates, and increased as the distance was lessened. The minimum potential itself, however, varied very little with the distance between the plates.

This minimum potential was of the same order as the cathode fall

* ‘Roy. Soc. Proc.’ vol. 52, p. 99.

of potential in air, as has been pointed out by Professor J. J. Thomson.* The following explanation may be offered of the fact that there is this minimum striking potential, and that it is approximately constant.

The negative glow in any gas, as has been shown by Warburg,† requires for its production a definite difference of potential (about 340 volts in the case of air) independent of the pressure and constant, so long as the glow is not crushed into a smaller space than that which it would naturally occupy. If the glow is crushed, the necessary potential is greater.

Let us now suppose that the discharge takes place between two parallel plates. A part of the space between these plates is occupied by the negative glow, a part by the positive column. So long as any of the positive column remains, it is clear that the negative glow is not constricted, and consequently it only requires 340 volts to produce it. The greater the length of the positive column, the greater the corresponding potential difference, so that the striking potential will be the least possible when the pressure is low enough to make the negative glow occupy the whole space between the plates, but not low enough to make it require more.

My experiments have been undertaken with a view to obtaining further experimental evidence on these ideas. The sparks were taken between large metal plates, $\frac{3}{4}$ mm. apart. For details of the apparatus and method of experimenting, the original paper must be consulted. There also will be found curves showing the relation between spark potential and pressure for the following gases: atmospheric air, hydrogen, nitrogen, helium.

I give here only the minimum value of the spark potential found for each, together with the cathode fall of potential given by Warburg:—

Nature of gas.	Cathode fall.	Minimum spark potential.
	volts.	volts.
Atmospheric air	340—350	341
Hydrogen	300	302, 308
Ordinary nitrogen	Variable, 315—340	347, 351, 369, 388
Nitrogen specially freed from all traces of oxygen	230	251
Helium	226	Variable, 326—261

It will be seen that on the whole, the evidence is in favour of the views explained above.

* 'Recent Researches in Electricity and Magnetism,' p. 158.

† 'Wied. Ann.,' vol. 31, p. 579.

It was found impracticable to get accurately consistent results in the case of helium. Some cause, the nature of which has not been traced, made the results differ with different samples of the gas, although in each case care had been taken with the purification. The helium curve, however, shows very peculiar features, the spark potential being, for a wide range of pressure in the neighbourhood of the minimum, almost independent of the pressure.

November 23, 1899.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

Professor Edward Divers (elected 1885) was admitted into the Society.

A List of the Presents received was laid on the table, and thanks ordered for them.

In pursuance of the Statutes, notice of the ensuing Anniversary Meeting was given from the Chair, and the list of Officers and Council nominated for election was read as follows :—

President.—Lord Lister, F.R.C.S., D.C.L., LL.D.

Treasurer.—Alfred Bray Kempe, M.A.

Secretaries.—{ Sir Michael Foster, K.C.B., D.C.L., LL.D.
{ Professor Arthur William Rücker, M.A., D.Sc.

Foreign Secretary.—Thomas Edward Thorpe, Sc.D., LL.D.

Other Members of Council.—Horace T. Brown, F.C.S. ; James Bryce, D.C.L. ; Captain Ettrick William Creak, R.N. ; Professor James Dewar, M.A. ; Professor Edwin Bailey Elliott, M.A. ; Hans Friedrich Gadow, Ph.D. ; Professor William Dobinson Halliburton, M.D. ; Professor William Abbott Herdman, D.Sc. ; Sir Andrew Noble, K.C.B. ; Professor Arnold William Reinold, M.A. ; George Johnstone Stoney, D.Sc. ; George James Symons, F.R.Met.Soc. ; J. J. H. Teall, M.A. ; Professor Joseph John Thomson, M.A. ; Professor Edward Burnett Tylor, D.C.L. ; Sir Samuel Wilks, Bart., M.D.

The following telegram from Her Majesty's Astronomer at the Cape of Good Hope was read :—“Lines of Beta Crucis 4552, 4569, 4575, described unknown in my April paper, Lunt finds due to silicon. Paper follows.”

The following Papers were read :—